

**IN THE CLAIMS:**

Please amend the claims to read as follows:

1. (Currently amended) A method for ~~the production of producing~~ a layer of functional molecules on a carrier surface ~~of a substrate~~, using ~~cell surface layer S-layer proteins (S-layer proteins)~~ as a carrier of the functional molecules, wherein comprising the steps of:  
providing a carrier surface;  
providing a solution containing S-layer proteins in the form of monomers or oligomers ;  
bringing the solution is brought into contact with the carrier surface ;  
, a layer of S-layer proteins is deposited depositing a layer of S-layer proteins on the carrier surface; and  
forming [[, and]] a two-dimensional crystalline structure is configured in the layer that is  
formed in this way thus deposited, resulting in a fixing of the S-layer proteins;  
, characterized in that  
wherein one of the steps comprises the step of forming functional molecules on the S-layer  
proteins;  
wherein the step of depositing the layer of S-layer proteins comprises the step of setting first  
electrochemical conditions at an electrochemical boundary layer on the carrier surface and the step  
of forming the two-dimensional crystalline structure comprises the step of setting second  
electrochemical conditions at the electrochemical boundary layer on the carrier surface, said second  
electrochemical conditions being different from said first electrochemical conditions; and  
wherein said step of forming the two-dimensional crystalline structure and fixing the S-layer  
proteins is electrochemically controlled by applying an electrical potential to the substrate with  
respect to a reference electrode provided in the solution to deposit the S-layer proteins,  
electrochemical conditions are set in the solution in which the S-layer proteins have an electrical net

~~charge and, by setting the electrical potential of the substrate, an electrochemical potential difference is created between the solution and the carrier surface under whose effect the S-layer proteins are added from the solution to the carrier surface.~~

Claims 2 and 3. (Canceled)

4. (Currently amended) The method as described in Claim [[2]] 1, characterized in that, to change the electrochemical conditions between deposition and crystallization, at least one chemical parameter of the solution is varied.

5. (Currently amended) The method as described in Claim [[2]] 1, characterized in that, to change the electrochemical conditions between deposition and crystallization, at least one electrochemical parameter of the solution is varied.

Claims 6 and 7. (Canceled)

8. (Previously presented) The method as described in Claim 1, characterized in that, in the deposition of the S-layer proteins and/or the formation of the crystalline structures, a conformation change of the proteins occurs, in particular a denaturing or renaturing.

9. (Previously presented) The method as described in Claim 1, characterized in that the deposition of the S-layer proteins and/or the formation of the crystalline structure are controlled by a time-varied potential curve.

10. (Previously presented) The method as described in Claim 1, characterized in that the deposition of the S-layer proteins on the substrate is carried out in a first solution and the formation of the crystalline structure is carried out in a second solution.

11. (Currently amended) The method as described in Claim 10, characterized in that a net charge is electrostatically ~~or electrophoretically~~ impressed on the substrate before dipping into the first solution and is maintained during the run through the solutions.

12. (Previously presented) The method as described in Claim 10, characterized in that a net charge is electrochemically impressed on the substrate in the first solution and is kept when the solutions are

changed.

13. (Currently amended) The method as described in Claim 10, characterized in that the change of solutions happens by transport of the carrier surface from a first solution bath for the deposition (~~for the deposition~~) to a second bath for the crystallization (~~for the crystallization~~).

14. (Previously presented) The method as described in Claim 1, characterized in that functional molecules are bonded to S-layer proteins even before the deposition of the S-layer proteins, and thereupon the functional molecules are deposited on the substrate simultaneously with the deposition of the S-layer proteins.

15. (Canceled)

16. (Previously presented) The method as described in Claim 1, characterized in that, after the formation of the crystalline structure in the S-layer stratum, functional molecules are deposited on the substrate at positions defined by the crystalline structure.

17. (Previously presented) The method as described in Claim 1, characterized in that, after the formation of the crystalline structure in the S-layer stratum, electrochemical nanoparticles are deposited on the substrate at positions defined by the crystalline structure.

Please enter the following new claims 18 and 19:

18. (New) The method according to claim 1, wherein the deposition of the S-layer proteins and the forming of the crystalline structure are controlled potentiostatically.

19. (New) The method according to claim 1, wherein the deposition of the S-layer proteins and the forming of the crystalline structure are controlled potentiostatically and are carried out in a time-separated manner and under different electrochemical conditions of at least one of the solution and/or the substrate.